

Probability

Conditional Probability

Identify probability wanted and event already happened.

$$P(A/B) = \frac{P(A \cap B)}{P(B)}$$

Probability of an event given some other event has occurred.

Dependent Events

A has effect on likelihood of B occurring

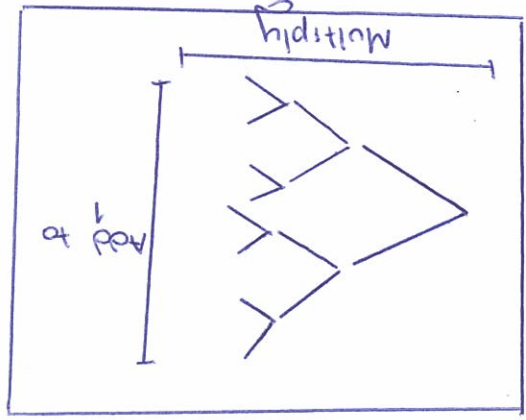
$$\text{Requires conditional probability} \\ P(A \cap B) = P(A) \times P(B/A)$$

Complementary Events

Covers all possibilities

$$P(A \cup A') = 1$$

Probability Trees



Venn Diagrams

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

Permutations

Order is important

Total number of arrangements
e.g. 4 positions
 $1 \times 2 \times 3 \times 4 = 24$

$$\text{total items} \uparrow \\ nP_r = \frac{n!}{(n-r)!} \quad \text{or } nPr \quad \text{group of items} \downarrow$$

Combinations

Order is not important

$$\text{total items} \uparrow \\ nCr = \frac{n!}{r!(n-r)!} \quad \text{or } nCr \quad \text{group} \downarrow$$

Union / Intersection

Intersection
 $A \cap B$
Both A and B occur

Union
 $A \cup B$
Either A or B occurs

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

Independent Events

A has no effect on B

Probability of both events occurring
 $P(A \cap B) = P(A) \times P(B)$
If equal A and B are independent

Mutually Exclusive Events

Probability of either event
 $P(A \cup B) = P(A) + P(B)$

Probability of both events
 $P(A \cap B) = 0$

Cannot both occur at the same time